

ABSTRACT OF THE DISCLOSURE

Leakage detection of cargo from the hold of a barge involves a mounting plate to the top hatch of the hold. Two pipes secured to the plate extend to locations near the bottom. Each pipe has a guide tube in it coaxial with the pipe. Each pipe has a float in it received around the guide tube. A float follower is in each tube and magnetically coupled to the float so that the float follower rises and falls with the float. One pipe has an open bottom for cargo to freely move up and down in the pipe as the hold is filled and emptied. The other pipe has a valve at the bottom for admitting cargo from the hold to the pipe at the port of origin of the vessel. Following loading of the cargo, the valve is closed. One embodiment tethers the floats to reels atop the plate. Any change of level of the floats, reflecting a loss of cargo during transit from the port of origin to that of destination, is reflected in relative rotation of the reels and triggering an output signal to an annunciator. Another embodiment employs lasers transmitting to and receiving from the float followers, reporting to a comparator producing an output signal to an annunciator upon recognition of a difference between distances indicated by laser output signals. A third embodiment eliminates the guide tubes, floats and float followers. Portable embodiments for measurement of liquid levels alone, and also useful for loss detection, include a carrier handle for hand carrying the measuring laser and computer from one tank to another in a multiple tank site or transporter to measure liquid levels in a number of tanks. Other embodiments include a portable combination ultrasonic measurement with laser measurement to indicate temperature in the atmosphere of the liquid level, along with indication of the level measurements.